Notebook, N-07-05-22.1

This notebook covers the periods May 1907 and October 1910. All entries are by Edison. The book contains notes and drawings regarding attempts to amplify phonograph recordings using an electromotograph. Included are tests of numerous compounds in the motograph cylinder, with some notations of the resulting sound quality. There are also entries relative to the wear on phonograph cylinders after repeated use. The front cover is labeled "Emg." The pages are unnumbered. Approximately 40 pages have been used.

May 22 1907

21% full strength seems to give loudest results, Wally + Bell phone alone as transmitter –

Saturated LiOH solution louder than 21% KOH or 15% NaOH, but our hair brush attacked by the alkali + this gets on track + spoils it – tried making a linen brush which is very little attacked by alkali –

I notice that after washing $SrCO_3$ cylinder several times + then stop it is loud for a while but gradually dies down but if the edges are wet + not the track it immediately gives full volume – The sides of the wand is platinized – Evidently the action either of the telephone current or more probably the polarization current + this insulates it up –

Am using Mica diaphram – palladium pressure foot –

May 23 1907

Have now limin brush to wet chalks with Linen cloth folded up + ends frayed out –

Tried holding the other pole on the Chalk so current could go thru base + also thru the pen held by hand on the moving surface. Couldnt find the slightest difference in values of sound –

Noticed when chalk got little dry high piccolo squeak Guy wetting the Edge of chalk next mandrill + not the track it instantly ceased This is a current effect + is a Phisnomenon –

By holding the palladium pen on Chalk + not using base at all sometimes it louder + sometimes not –

with a $BaCO_3$ Chalk wet with LiOH, then as it got little dry used Na_2CO_3 to wet, dilute dose well as of used LiOH, but not much difference —

Putting in Aluminum Rectifier one way weakens the other way with anode Res strengthens it double but in great resistance dont seem to make any difference —
The Rectifier has 10 inches surface think it would be better for this experiment there was not more than 1/2 or 1/4 inch surface —
It probably acts to prevent the Chalk generally a back current,

Platinum + Palladium pens seems to G2 about same volume –

With mixture of 21% with some LiOH, I hear it with tubes very plain with very little sensitivity, thru 12 600 ohms. Although in –

Silicon pen not quite so loud, it beat on bad spot in – possibly the chalk is getting worse or it would have been as good as Platinum – it is not perfect a uniform Except in one half of it + this might not have engaged the chalk –

Silver pen – little weaker than Silicon but probably due to cylinder going bad –

Aluminum not a sound on short. Current even –

Antimony little weaker than Silicon probably ~~as good as~~ that if had good chalk hear it on 12600 –

Bismuth — ½ as loud on short current as platinum makes a black track —

Magnesium — not a sound on short current — blackens the track most rapid yet — few turns does it —

Arsenic — This dont blacken the track seems to be good & worthy of going with platinum seems to scratch very little — Alkaline — find get better results when wires are on way on check than the other —

Nickel — good but should say not so loud as platinum —

Cobalt — better than Nickel 25%

Gold not loud - cant hear on 12600 ohm - may be check galling bad -

Cadmium - ~~Nothing~~ old check - cant hear thing - New check - faint on short circuit -

Chromium - just hear on short ckt -

Thallium Nothing -

Carbon Very faint on short circuit!

Amalite, loud on sht ckt can hear on 12600 ohm but not so loud as galena I think

Magnetite Not a sound -

Berryllium - No sound

Iron — Very poor on 1" short ckt -

Tin — Very faint on short ckt.

Iridium ball — Al of Rect to pen not very loud on short ckt & 1/2 as loud on 12000 ohm showing that balls are good for very lts & high Res no scratch on pulling - Al of Rect to brass (12) Reversing Dynamo in Eng no sound on short ckt.

Have very delicate receivers and Gernade with very perfect hand balls light pressure - for London on heavy Current the surface should increase in proportion

to the Comment -

Osmium Iridium Ball - Nothing
poss by nat pt Ir -

Platinum Iridium Ball -
about same as Iridium Ball.
same phenom as to hardness on
alt chk + 12000 ohm Cent not
so good -

What is wanted is an
Iridium point pen for strong
Colorists & larger Iridium
ball for 10 & 12 ohms
No perceptible wear after
back is made

New Al Rectfr 1' I surface Al facing the Round Carbon —
Platinum pen, 21% KOH, near plain 12600 ohm Very loud on short ckt. Al to pen. Carbon to line & other End line to Gouge - Best —

Pt pen - new check wet 15% K_2CO_3 about as good on 12600 but not so loud 1/2 on short ckt -

Test with dif Solutions -

Plat pen $SrCO_3$ check -

Bell Telph Al Rect. short ckt &
12600 ohm

Aluminate Soda Saturated
1/2 loud as KOH, near plainly on 12600
Check little Rough -
adding little KOH doesn't improve it
soaks up solution very slow —

50 cc H_2O 20 cc Silicate Sol of strength of 10% —
too weak — Showed big strong Silicate in 21% —

Strontium Aquarium Sat
Sol — can hear on 12600
~~not~~ scarcely any stronger
on short ch — not loud
even when KOH used —

K Bromide 1/4 loud of KOH.
Notice that when Al to base
it can be heard thru 12600 +
not when Al to pos —
also notice when Al to pos
+ Al Rod shortened little louder
on short ch but squeaky at times.
Thus KBr acts little chf — than
those previous — Tried KOH,
Made up 1/2 loud as KOH alone

K Chloride alone 1/2 loudness after nearly saturated then KOH, think it nearly as loud as KOH alone, very clear & plain on 12600 +
Notice this Carbon gave Extraordinarily smooth Crack Cant hear a scratch or sound of any kind even when Reversed probably many times extra good crack — Notice it gave pulsed tracks cathode width, few which is unlike most others possibly this is accidental because of no scratch —

K Nitrate not so good as K Chloride

21% saturated with PbO —
3/4 loud Reg but came
louder when put KOH
on track — showing its
inferior to KOH.

Barium Hydrate Sat Sol —
1/2 loud but when KOH put on
its loud think it as loud as
have heard with Bell —
Notice by pulling great
pressure on & getting wide
track & then letting up
on pressure loud increases

K phos then KOH plenty — Very loud
as loud as I have heard
Stands great pressure. 9 mm
probably KOH alone is as good
not very sensitive to 120 cg —

Chl Barium followed by KOH.
alone BaCl 1/4 lound — with
KOH about 1 Reg or less —
Can hear in 1260d — not
other smooth —

Hyposulphite Soda 1/2 to 1/3rd
lound of KOH add
KOH, 3/4 lound of KOH alone
~~then add~~

Chl Zinc 1/4 lound KOH, 3/4 lounds
loses soon —

Sulphate Cu Mg - KOH, poor —
KS nothing

Bell Recer for Transmitter

Bismuth Cylinder & Aluminum pen
Bell Recer or Transmitter no sound

Bismuth Cylinder Copper pen —
Bell Trans. — no sound.

Bismuth = Iron pen —
Bell Trans. — no sound

Bismuth Platinum pen —
Bell Trans No sound.

Bismuth Zinc pen
Bell Trans — no sound

Bismuth — Arsenic pen
Bell Trans — no sound

Bismuth — Aluminum pen —
Bell Transmitter — No sound
West with Pi Card No "

Bismuth – Thallium pen –
Bell trans – no sound – moistened Bi
with KOH, thunk heard faint sound
on light pressure –

Aluminium Cylinder Nickel pen
Bell trans no sound – K_2CO_3 BiC – no sound
KOH, no sound –

Magnesium Cylinder Nickel pen –
Bell trans. – thunk heard it
KOH, thunk heard it no sure –

Reg chalk KOH (often I pressed
Rebently pressing Hgl. against surface
& wet cloth KOH, (I spoke sound
Mg –

Induction Coil (Telephone) 1 Cell £ 18 –
Key = given hard knock 12000 ohms –

For testing if there is any knock between sketches –

Lead Cylinder Platinum pen
Nothing

Lead Cyl Cu pen
Nothing

Lead Cyl Brass pen
Nothing

Lead Cyl – Plat Iridium ball –
Nothing

Zinc Cylinder – Plat-Irid ball –
Nothing

Oxalate Tin — KOH dissol go in
No Sound — gt pen —

Zinc Hydrate — about 3/4 or less
of Req $SrCO_3$ —

Oxalate Magnesium. Cannot
hear on Short cut
Scales off with pressure Mg

Manganese Hydrate, Scratchy
Cracks — Cannot hear a Sound
on Short cut —

Experiments with $SrCO_3$

Moist before pressing —

1 cc H_2O to 20 grms $SrCO_3$
Much louder than dry $SrCO_3$

$1\frac{1}{2}$ cc Louder than 1 cc.
12600 ohms 1/3rd loudness of
dry moistened on short ckt

2 cc Not as loud as $1\frac{1}{2}$ but
probably not mixed as well
as

$2\frac{1}{2}$ cc is as loud as $1\frac{1}{2}$ cc
This is the limit as any
further water makes it
squeeze out in press —
about 2 cc is Best probably

Phenomenon
Smooth scarcely any sound by Fred pt
E heavy no scratch whatever —

Left a good $SnCl_2$ after boiling 3 days. when cool with H_2O only weak. dilute KOH scrapped off on forge no better again weak KOH, 1/3rd Loudness of original —

Electro Silicon - plat pen — KOH 1%
3/4 loud of best - very smooth
no scratch - louder with moderate quantity KOH,
try LiOH + NaOH do this is Silicon - Can probably use acids. — Have Dr C. test see what it is —
Track platinum —

Iron Oxalate Plat pen —
KOH 2% no - pops or flakes off

Zinc Oxalate – Pt pan —
Water wet — Ng

KOH wet dilute – Ng

KOH. 21% Ng
Rough – Very great friction
1/4 load one way turning a coarse
any other way — Thus all BB
has big friction when 21% KOH —

Antimony Oxalate – Pt pan —
21% KOH —
All cracks up on cutting

Reg Fe Mix from Silver/Cobb Pt pan
1/4 as load – Very severely + friction
4 grs orks load – takes enormous
amount KOH —

Phenomenon

$Ni(OH)_2$ 1/2 week Pt pen —
Not a Sound — Keeps
Green — good track — strange —
Wet 21% ROH.

Magnesium Hydrate Pt Pen —
3/4 of Reg Loud — Very very smooth
Something in this hear on 12600

Lead Oxalate — Pt Point ROH 21%
decomposes scarcely hear
Round flakes —

French Chalk — Pt point 21% ROH
Not a Sound Not smooth

Kaolin – Pt pint – 21% KOH
Not a sound

Nickel Oxalate Pt pint KOH 21%
No sound scales rolled off

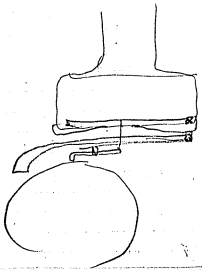
Lead Hydrate Pt pint 21%
Extremely hard
Scarcely heat it – Ng
Dont take KOH to scale
only little –

Aluminum Powder pt pint
Ng – attacked by KOH,

Tried fuller Earth cylinder
but the moment the KOH put
on it softened & broke — Nil

Get Telephone with 2 poles
close together —

This is my phone arm thus



This is good — got it adjustable
to & from Dip —
On short ckt the 1/2 as loud as
Record direct thru funnel of
not 5/8 thru = ~~HD~~ by using
a pt at pen twice as wide as
Rec got it louder than with
Rec width =.
~~BU~~ When Rec is in the clear
but when short ckt there is
lot of squeezy sounds &
unwanted clattering, either
that there is a limit to Ch. MK
or the dia is too flimsy
to 4. 4 + 4 built up
Urea — changed to 5/1000
about the water —
Must have a stiffer dia
to stand the hot by pressure
~~with~~ I used an double
width dia — when 12000
ohms in the family-cord
in tube, ~~opened ckt +~~
put finger across Blade,
with 12000 ohms in
bazaar — the just about as
loud thru finger + 12000

as when switch closed -
Evidently it counts a
slight dia or trigger -
Put in 10/1000 steel not
enough - Shows such a
powerful friction that
the elastic power of dia
is unable to pull shell
back against the friction
but holding thumb &
pressing it back it closes
the heavy sound shows
necessity of powerful
spring forward -

11/32 dia pretty good 1/2 Reg
Lond - 20/1000 steel balls 62 deg
10/1000 Rhodium rings OK +
steel =

Found that Mg hydrox
is very smooth, + possibly
fric + ~~[illegible]~~ 1/2 pts lond
to Sr Carb - Think
mixture of 75 $SrCO_3$ + $MgOH_2$
will be fine -

Only 2 brushfuls KOH 21
on New $SrCO_3$ Chalk is best
~~in~~ = its so hard with 10/000
steel, dia + rubber rings
Can't hold tube in clear
Have to use 1500 ohms
to stand it =
Comes out in funnel
nearly as hard as
direct from Record —

Oct 1 1910

Started Experiments again with Holograph =

Cooper $SrCO_3$ Cylinder 21 Kolt, Bell Rivers — don't seem to be any where near as loud as older Experiments but I have grown much deafer which may be the reason

I now am going to try washing Cylinders with different Solutions —

1½ Microfarads in no acceptance
No Resistance in 1st test + then to determine Sensitiveness and was till close sounds

Washed chalk key in water after washing

1 = Citrate Soda, 1/4 Loud of 21 K added funnally a little KOH, no better —

2 = Ferrocyat 1/4 loud, added KOH no better

3 = Cyanate K - 1/2 loud of 21 K added 21 K no better —

4 - Tungstate K -
Can hear 6000 ohm with KOH, little better think its louder than KOH, alone, Should try stunts on Tungsten Compounds,

5 Phosphate Soda 1/4 -
its high res as can hear at 4600 ohm - added KOH. hear at 6000 ohm

6 = Cons L. Oth –

This is better than 21 KOH.
& confirms previous statement
that it was the best near it
quite well thru 12500 ohm
& louder than 21K on
short ckt –

Note, I do not hear in one
tube in ear hard expansion
performed but by pressing
ear at one place can hear
nearly as loud as in
the other ear in tube –

added little KOH say 1/2 & 1/2
little better, too loud on
short ckt –

It is evident that Res of
Chalk too high & as
I intend to work on
short ckt must
widen the pen

to get resistence.

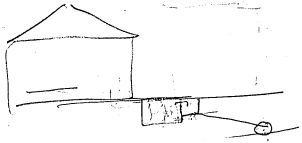
Wider pen is still better —

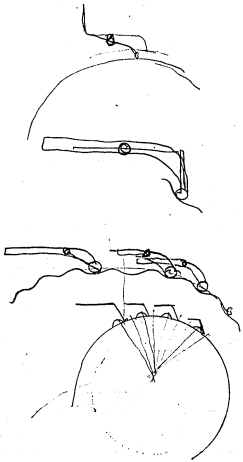
Must have split wide pen
& bal joint & stiff arm —
a very wide pen —

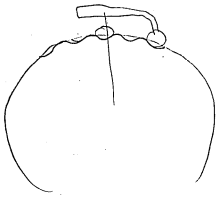
Wide platina (Double width)

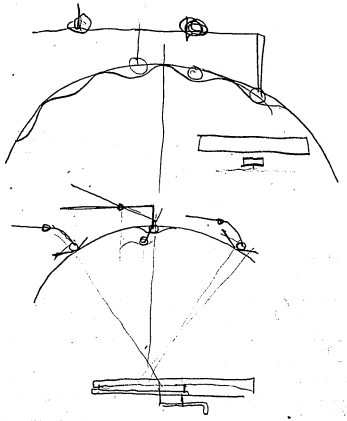
Mix of LiOH KOH NaOH —
squeeks if detached OK —
hgar thru 12500 Cam head
several ft away in funnel

Pulling Mercury out
on surface goes 1/4
loudness









Wear of Mouldm Records 4 min

Some amberola apks run 75 times
on No 70 Record 47 words —
wear record very little, no destruction
of walls — Records sounds ok to
the last, no side wipes or jumping
of apks — This on Idelia

When this a good apesker is put
on amberola rigged up to take
the Idela apks & Cygnet horn
one record at 25 was fair
2nd record all worn out many
side wipes & jumping over
threads at 25 — This shows
there is motions giving the
amberola mandrel that
is not in the Idela —

The shifting of the mandrel
is very bad — The limiting
washer is to out of true
vibrates cylinder thickness
which is also bad —

15 | 7500 (5
450
750
15

This is the character of the jump that destroys the records —

450 Vibration Sec = 2 vibration $\frac{1}{225}$th part of a second —

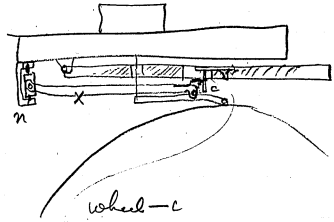
This would show, that the lot or mandril is too slow & that it is the small lever that gets to the limit & the wire to diagram jerks it back. But the movement of lot or Mandril is the cause of little lever reaching to limit

Oct 15 1905

So far Experiments show that Naturally the lateral movements of weight + lever, they do not compensate but the fixed screw controls the ball lever with rotating fulcrum is a positive defect instead of an advantage as heretofore supposed — owing to short leverage of the ball section the swing of this section places button across the grooves + wears out record.

Any lateral movement of the button should be on the longest lever possible —
The weight should have no endwise movement, as jarring of Machine puts little legs to one side + wears record
~~the~~
The ball point + lever can never be moved by the record until it can

move sideways extremely Easy
the heavy weight has too much
motion to permit it. The only
way I think is possible is
thus

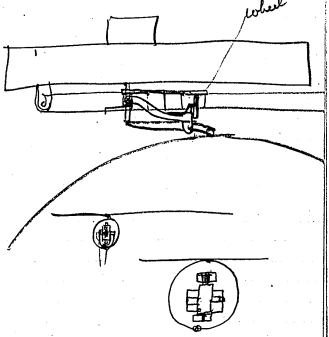


X is long lever with universal
joint at n, has wheel C
which connects weight
to tall lever thing X.
the wheel is 250/1000 dia.
with a 10/1000 per Bearing
any sideways motion deals
with and recovery X is
very Easy Gearing 25 To 1.

Fig 1.

the only defect is that the button lever does not move arcwise concentric with the center of the arm

arm making another one turn

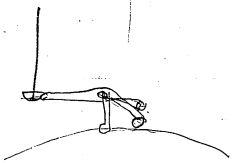


We are now spending
15 Shellac
5 Sabra
1 3cc Dichlorohydrin —
the latter dissolves the
brittleness of Compound
so it dont bite off on
going up hill —

We make five second
1/32 thick + peel in Ends
its rather fragile + we
are putting in
flocked Asbestos
which well

make it tough
the main trick in race
Cashedon is to get it
exceedingly fine & not
Clothed Together —

One record has gone
on long part 500 line
& scarcely shows was
Uncle Bill wheel
bullow Cambe ward
& then gradually unpacking
quality of horses



List pers

Osmium-Iridium	Point	Sulfide Iron
Iridium		Smaltite
Platinum		Magnetite
Palladium		Chromium
Zinc		Cadmium
Lead		Silver
Antimony		Copper
Bismuth		
Tin		
Aluminum		
Magnesium		
Silicon		
Thallium		
Arsenic		
Cobalt		
Nickel		
Gold		
Iron		
Beryllium		
Carbon flat		
Plate-Iridium	point	

12 | 18 (1.5
12
60

50
300
60
0
12 | 41 (17
12
82
0
84

5 50

15 300

50

40) 430 (10.7

40

300

3

4c

11c 10%

7.5 13.5

6.0

81.0

81.00